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Revision of *Arcastes* Baly, 1865 from the Oriental Region (Coleoptera, Chrysomelidae, Galerucinae)

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Abstract

The species of the genus *Arcastes* Baly, 1865 from Oriental Region are revised. The type species is *A. biplagiata* Baly, 1865 by original designation. The genus *Arcastes* was erected by Baly based on a peculiar shape of the antennae. Subsequently, eight other species have been described in this genus. Up to now this genus was not revised, in particular the male and female genitalia have not yet been studied. Studies of the type material revealed, that *A. biplagiata* possess a very peculiar shape of median lobe and endophallic structures. Next to the genotype, only two valid species remain in this genus: *Arcastes suturalis* Jacoby, 1884 (with *A. ismaili* Mohamedsaid, 2000 as new synonym), and *Arcastes dimidiata* Laboissière, 1929. *Arcastes sumatrensis* Jacoby, 1884 is a new junior synonym of *Neolepta biplagiata* Jacoby, 1884. All other species need to be transferred to other genera that will be subject of the ongoing revision of the Oriental Galerucinae. Distribution of the three species of *Arcastes* is restricted to Singapore, Malaysia, and Indonesia, southward to Java. In this paper we provide redescriptions of the genus and the valid species, including illustrations of external and genitalic characters, photographs of the primary type specimens, distribution maps and a key.

Keywords

Galerucinae, *Arcastes*, Oriental region, revision, taxonomy, redescription, new synonym

* 33rd contribution to the taxonomy, phylogeny and biogeography of the Galerucinae

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Introduction

The genus *Arcastes* was established by Baly in 1865 when he described *Arcastes biplagiata* Baly, 1865, which he originally designated as the genotype. Wilcox (1973) placed it in the section "Monoleptites" due to the strongly elongated basi-metatarsus. Since the introduction of the genus, eight species have been described: *A. sanguinea* Jacoby, 1892 from Perak (Malaysia), *A. sumatrensis* Jacoby, 1884 from Sumatra, *A. suturalis* Jacoby, 1884 from Sumatra, *A. dimidiata* Laboissière, 1929 from Siberut Island (Indonesia), *A. astridae* Laboissière, 1932 from Sumatra, *A. nigripennis* Laboissière, 1932 from Borneo, *A. tectonae* Laboissière, 1932 from Java, and *A. ismaili* Mohamedsaid, 2000 from Sabah (Malaysia).

Baly (1865) and subsequent authors assigned species to *Arcastes* based on merely external morphological characters, in particular the enlarged third to seventh antennomeres. After checking the genitalic patterns of the species named above and many other oriental "Monoleptites", it became clear that the median lobe has a peculiar outer shape and asymmetric endophallic structures. Both characters are very useful to delimit this genus from others, while enlarged medial antennomeres also occur in some species of *Monolepta* and *Neolepta*.

Only three species remain in *Arcastes* based mainly on characters of the genitalic structures of the type species. *Arcastes sumatrensis* Jacoby, 1884 is a new junior synonym of *Neolepta biplagiata* Jacoby, 1884. All other species need to be transferred to other genera that will be subject on the ongoing revision of Oriental Galerucinae. An illustration of external and genitalic characters are presented here for these taxa, photographs of the primary type specimens, distribution maps and a key are also included.

Materials and methods

A standard set of figures is given for each species. These include illustrations of the coloration (dorsal view), including the right antenna, where black coloration is indicated by black, yellow coloration by white, red coloration by light grey, and brown by dark grey shading.

The antennomeres of males and females, dorsal, ventral and lateral view of the median lobe including the endophallic structures, spermathecae of three females (if available) and bursa-sclerites (if available) usually of one female are figured. For the redescription of the genus, illustrations of the pro-, meso- and metathorax, female and male abdomen, right legs in ventral view and of the right hind wing in dorsal view are given.

Measurements were made for external characters. Absolute measurements are: total length from the clypeus to apex of the elytron, length of the elytron, maximal width of both elytra (usually in the middle or posterior third of the elytra), and width of the pronotum. Relative measurements are: length to width of the pronotum, maximal width of both elytra to length of the elytron, length of the second to third antennomer-

es, and length of the third to fourth antennomeres. A number of specimens measured is given in the description under "total length". Further materials examined are listed, and all label data are exactly re-written.

The subsequent redescriptions are based on labelled specimens from the following collections (Table 1). Acronyms used and responsible curators in brackets: The Natural History Museum, London (BMNH; S. Shute); Institute Royal des Sciences Naturelle de Belgique, Brussels (IRSN; P. Limbourg); Museum of Comparative Zoology, Harvard University (MCZH); Museum für Naturkunde der Humboldt Universität, Berlin (MNHU; J. Frisch, J. Willers); Swedish Museum of Natural History Stockholm (NHRS; Bert Viklund); Nationaal Natuurhistorisch Museum, Leiden (NNML; F. van Assen); Center for Insect Systematics, UKM, Malaysia (UKM; R. Yusop), Collection of Jan Bezděk, Bruno (CJB).

For location data, geographical coordinates were given in degree and minute. These coordinates were mostly taken from Google Earth. The distribution maps have been produced by ArcGis.

Redescription *Arcastes* Baly, 1865

Type species. *Arcastes biplagiata* Baly, 1865 by original designation.

Total length. 4.45–7.35 mm (mean: 5.67)

Head. Brownish-red to red. Very finely punctuated, with significant transverse impression between posterior third of eyes. Eyes large, strongly convex (Fig. 1). Labial palpi slender and maxillary palpi enlarged, occasionally dark brown to black (Fig. 2a). Labrum pale to dark brown and occasionally blackish in middle. Mandible pale yellow to dark brown and blackish towards apex. Antennae elongated, extended to apical third of elytra (Fig. 1); third to terminal antennomere densely covered by bristle-like setae. First to eighth or ninth antennomeres black, two to three terminal antennomeres contrasting pale yellow to yellowish-brown, only in *A. dimidiata* two basal antennomeres also yellowish. First antennomere club-shaped, second shortest, third antenno-

Table 1. Numbers of material examined and collections investigated.

Collections	***A. biplagiata* Baly, 1865**	***A. suturalis* Jacoby, 1884**	***A. dimidiata* Laboissière, 1929**
BMNH	37	40	5
IRSN	3	3	–
UKM	–	39	–
NNML	24	27	–
MCZH	–	1	–
MNHU	3	3	–
NHRS	1	–	–
CJB	12	5	–
Total	**80**	**118**	**5**

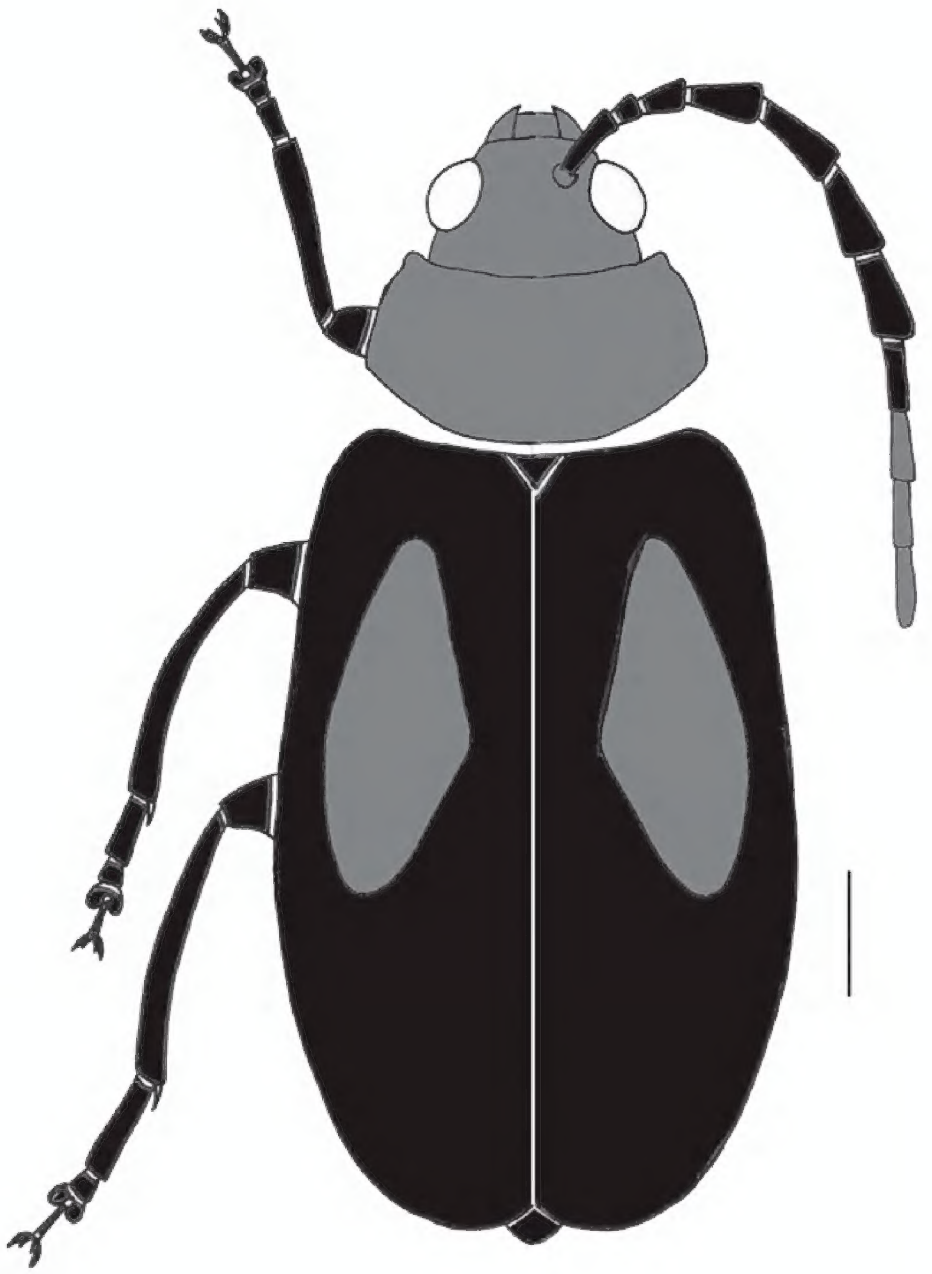

Figure 1. *Arcastes biplagiata* Baly, 1865. Dorsal colour pattern. scale bar: 1 mm (same for all following Figures)

mere about two times longer than second; ratio length of second to third antennomere 0.50–0.57 (mean: 0.54); third to seventh antennomere broad, significantly enlarged, ratio length of third to fourth antennomeres 0.60–0.70 (mean: 0.65), eighth to eleventh antennomeres much slenderer (Figs 8, 14, 20).

Thorax. Pronotum transverse, very broad, broadest in middle, anterior angle significantly protruding, posterior angle slightly marked, pronotum with deeply impressed line along lateral margins (Fig. 1). Brownish-red to red as head, shiny, smooth, and finely punctuated, without transverse depression. Pronotal width 1.55–2.25 mm (mean: 1.90), ratio length to width 0.48–0.57 (mean: 0.53). Scutellum large, triangular, impunctate, brownish, red or black. Procoxal cavities partly open (Fig. 2b). Meso- and metathorax reddish-brown to black. Metasternum broad (Fig. 2c). Elytra elongated, either black throughout, or black with longitudinal yellowish-red spot on disc of each elytron, or black with yellowish to reddish suture that in some species reaches

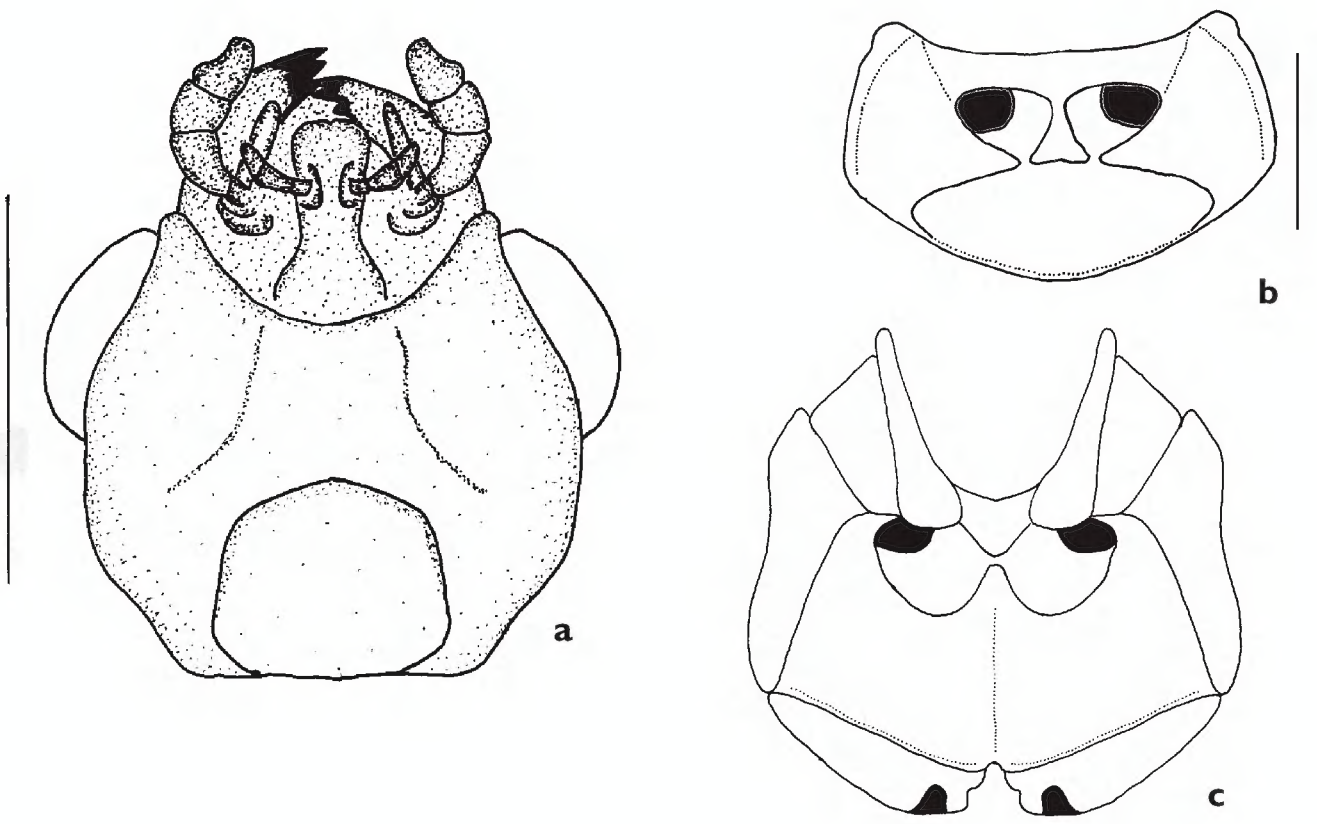

Figure 2. *Arcastes biplagiata* Baly, 1865. **a** Head **b** prothorax **c** meso- and metathorax, ventral view.

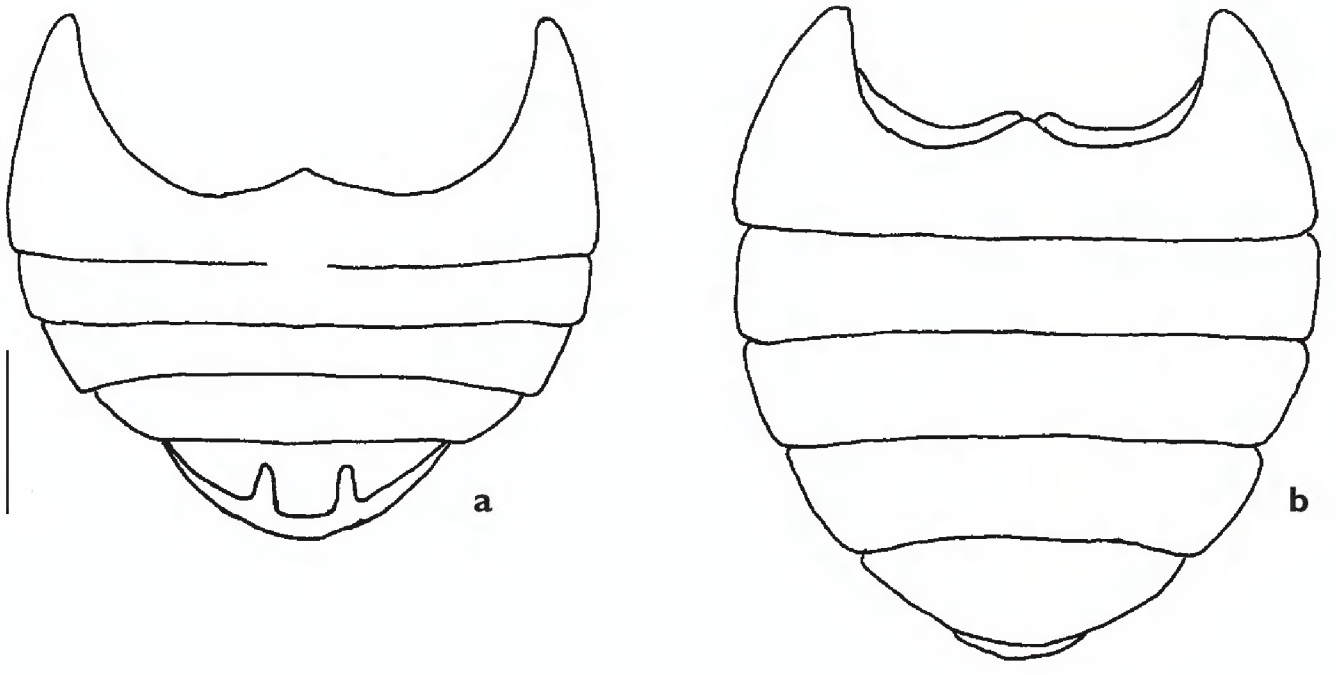

Figure 3. *Arcastes biplagiata* Baly, 1865. Abdomen, ventral **a** male **b** female.

up to one third of each elytron, or basal third completely red and apical two thirds black. Elytra shiny, punctation fine, irregular, slightly coarser and denser than that of pronotum. Elytral length 3.80–5.90 mm (mean: 4.73), maximum width of both elytra together 1.50–4.00 mm (mean: 2.79), ratio of maximum width of both elytra together to length of elytra 0.61–0.72 (mean: 0.66). Alae fully developed (Fig. 4). Legs long and slender, basi-metatarsus elongated (Fig. 5), coxa and trochanter reddish like underside, femur, tibia and tarsus black throughout, tibia with dense and fine setae.

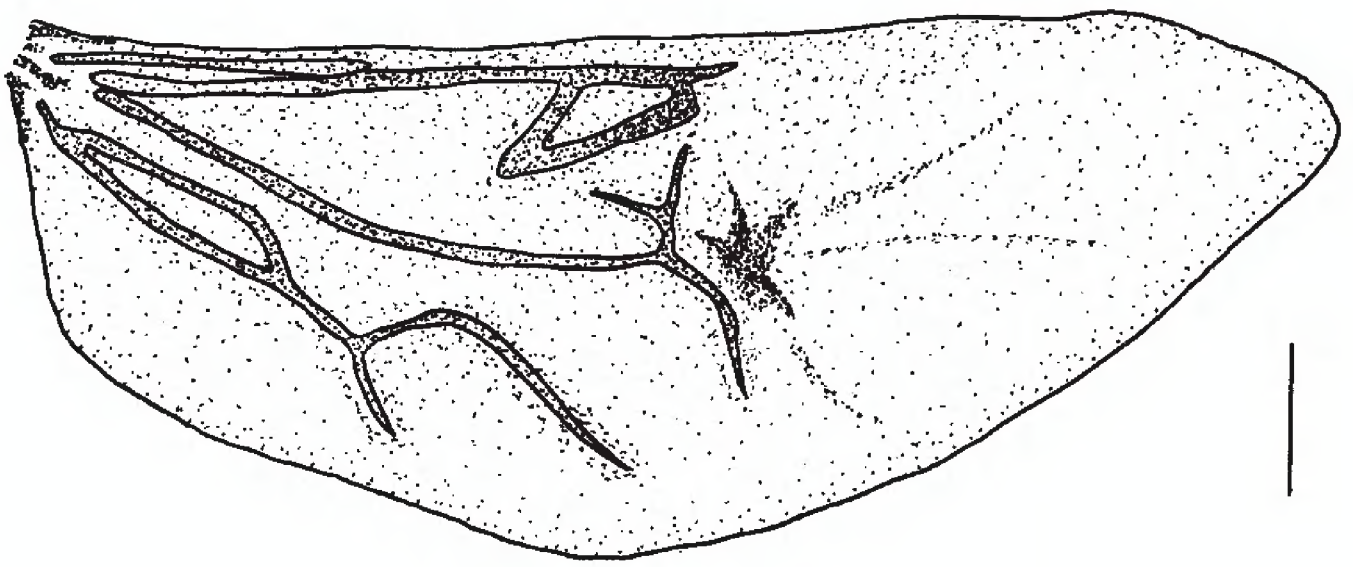

Figure 4. *Arcastes biplagiata* Baly, 1865. Hindwing, right, dorsal view.

Figure 5. *Arcastes biplagiata* Baly, 1865. Legs: **a** prothoracic **b** mesothoracic **c** metathoracic.

Abdomen. Pale yellow to reddish-brown, occasionally darker in middle, and seventh sternite usually dark brown to black. Last visible sternite in females rounded at apex, and in males with two deep, parallel-sided incisions (Fig. 3).

Male genitalia. The outer shape of median lobe is symmetrical, strongly sclerotized, apex tapered, slightly rounded and not incised. Orifice wide, more or less circular to slightly rectangular. Endophallic structures asymmetrically arranged, ventral spiculae hammer-like, median spiculae narrower, slender, lateral spiculae enlarged and slender, with claw-like small spine medially and tube-like, curved spines. Tectum not

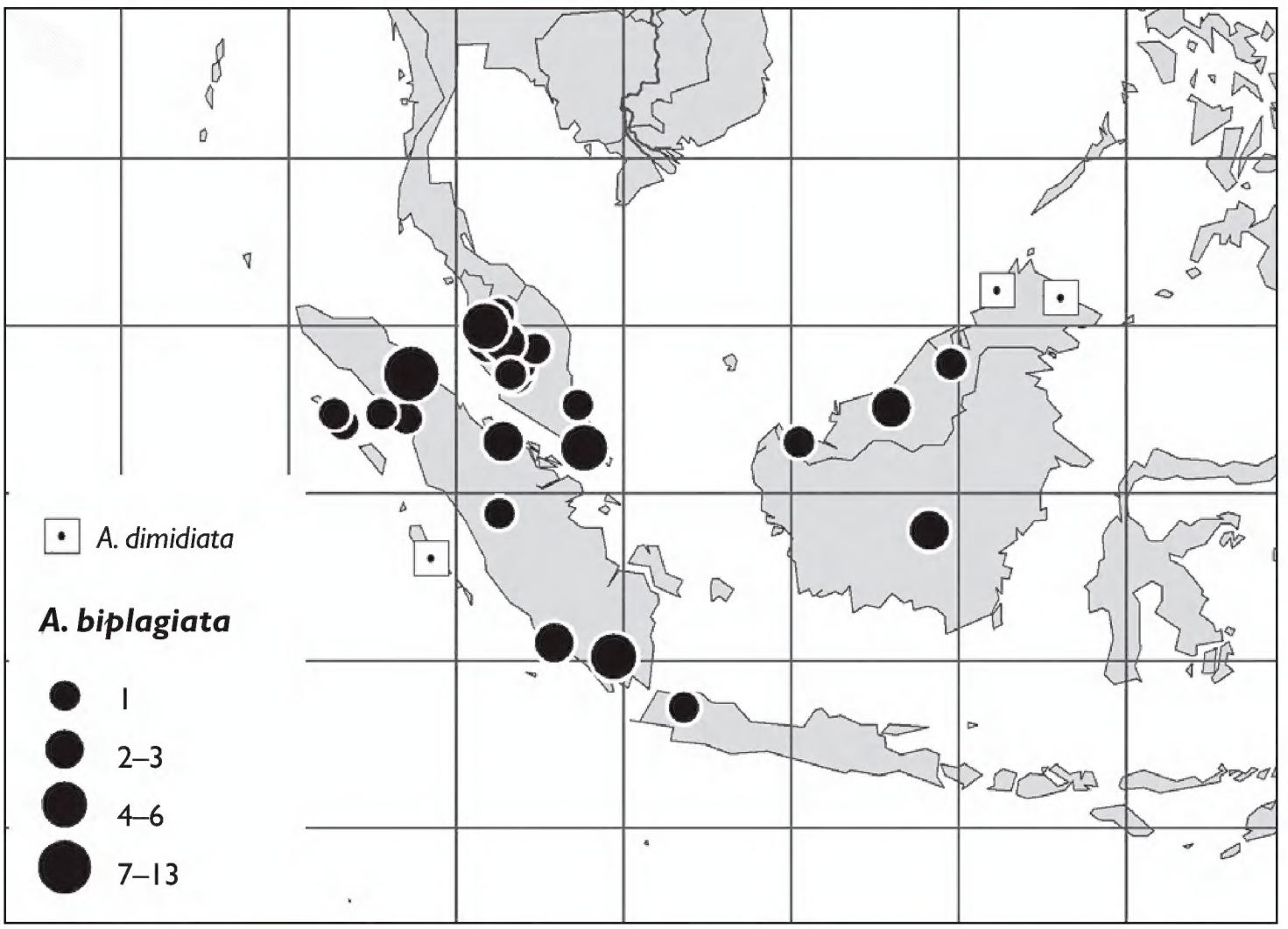

Figure 6. Distribution of *Arcastes biplagiata* Baly, 1865 and *A. dimidiata* Laboissière, 1929

incised at apex, almost reaching apex of the median lobe, constricted at middle part and enlarged at base (Figs 9, 15, 21).

Female genitalia. Spermatheca with oval to slender and elongated nodulus. Middle part long and slightly curved, cornu long and curved (Figs 10, 16, 22). Without stronger sclerotized bursa sclerites.

Distribution. The species are restricted to South-East Asia and up to now only recorded from Singapore, Malaysia (Peninsular) and Indonesia (Borneo, Sumatra), southwards to Java (Figs 6, 17).

Diagnosis. Beetles of the genus *Arcastes* are medium sized Galerucinae with strongly elongated basi-metatarsus, without pronotal impressions, reddish head and pronotum and usually contrasting black antennae, legs and elytra, the latter often with yellowish to red spots, suture or base. The significantly enlarged third to eighth antennomeres are very characteristic. *Arcastes* is the most similar to *Neolepta* Jacoby, 1884, with the type species, *Neolepta biplagiata* Jacoby, 1884, looking very similar to *Arcastes biplagiata* at the first glance. Antennae of these beetles are similar with slightly to strongly enlarged antennomeres in the middle, while terminal antennomeres in *Neolepta* are also black, the basal two antennomeres are reddish, and much slenderer than in *Arcastes*. The dorsal coloration is also similar, but *N. biplagiata* posses a pale yellowish transverse band or nearly circular spot in the middle of each elytron. The genitalic patterns of both sexes possess very strong differences. Asymmetric endophallic spiculae of certain shape

Figure 7. *Arcastes biplagiata* Baly, 1865. Photographs of the lectotype of *A. biplagiata* Baly, 1865 **a** with labels **b** detail.

(Figs 9, 15, 21) as in *Arcastes* are a unique pattern in oriental galerucines with elongated basi-metatarsus, while the median lobe in *Neolepta*, as in *Monolepta*, and *Candezea*, is narrower and has symmetrically arranged endophallic spiculae which are much smaller (cf. Wagner 2001, Wagner and Kurtscheid 2005). The shape of spermatheca of *Arcastes* resembles that of *Monolepta*, but in *Arcastes* it lacks sclerotized bursa-sclerites, while in *Monolepta* there are two distinct types of this structure. Also *Neolepta* and *Candeza* have strongly sclerotized bursa-sclerites.

The pronotum of *Arcastes* (ratio length to width 0.48–0.57), is on average broader than in *Monolepta* and *Neolepta* (0.52–0.65), and within the range of *Candezea* (0.42–0.59). Procoxal cavities are similarly structured (partly open) in all these genera. The third antennomere of *Arcastes* is roughly twice as long as the second (ratio length of second to third antennomere: 0.50–0.57), which is similar to *Candezea* (0.49–0.63) but different from *Neolepta* and *Monolepta* which both have the second and third antennomere of about equal length (0.82–1.10). While *Candezea* have strongly elongated, slender antennomeres, *Arcastes* species can be clearly differentiated by the enlarged median ones.

Redescriptions of species

Arcastes biplagiata Baly, 1865

Arcastes biplagiata Baly, 1865: 147

Total length. 4.45–7.35 mm (mean: 5.96 mm, n=12)

Head. Reddish-brown to red. Antennae entirely black and only the terminal three antennomeres usually contrasting pale yellow to reddish (Figs 1, 7). Ratio of length of second to third antennomeres 0.50–0.57 (mean: 0.53); third to seventh antennomeres enlarged, ratio of length of third to fourth antennomeres 0.60–0.67 (mean: 0.63), eighth to eleventh antennomeres very slender (Fig. 8).

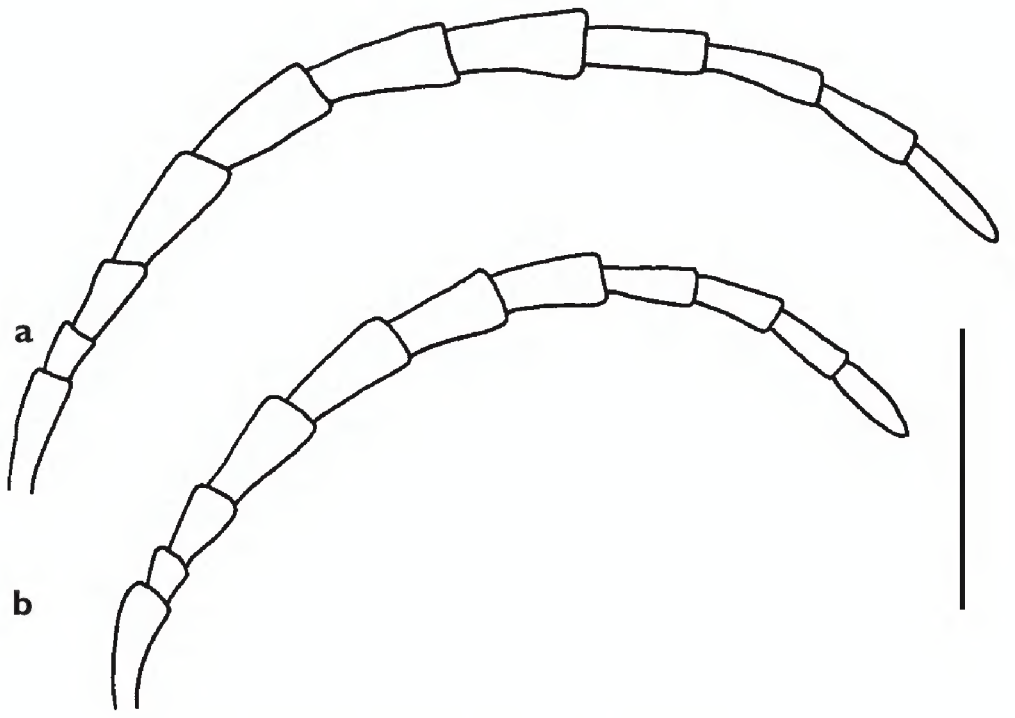

Figure 8. *Arcastes biplagiata* Baly, 1865. Antennae: **a** male **b** female.

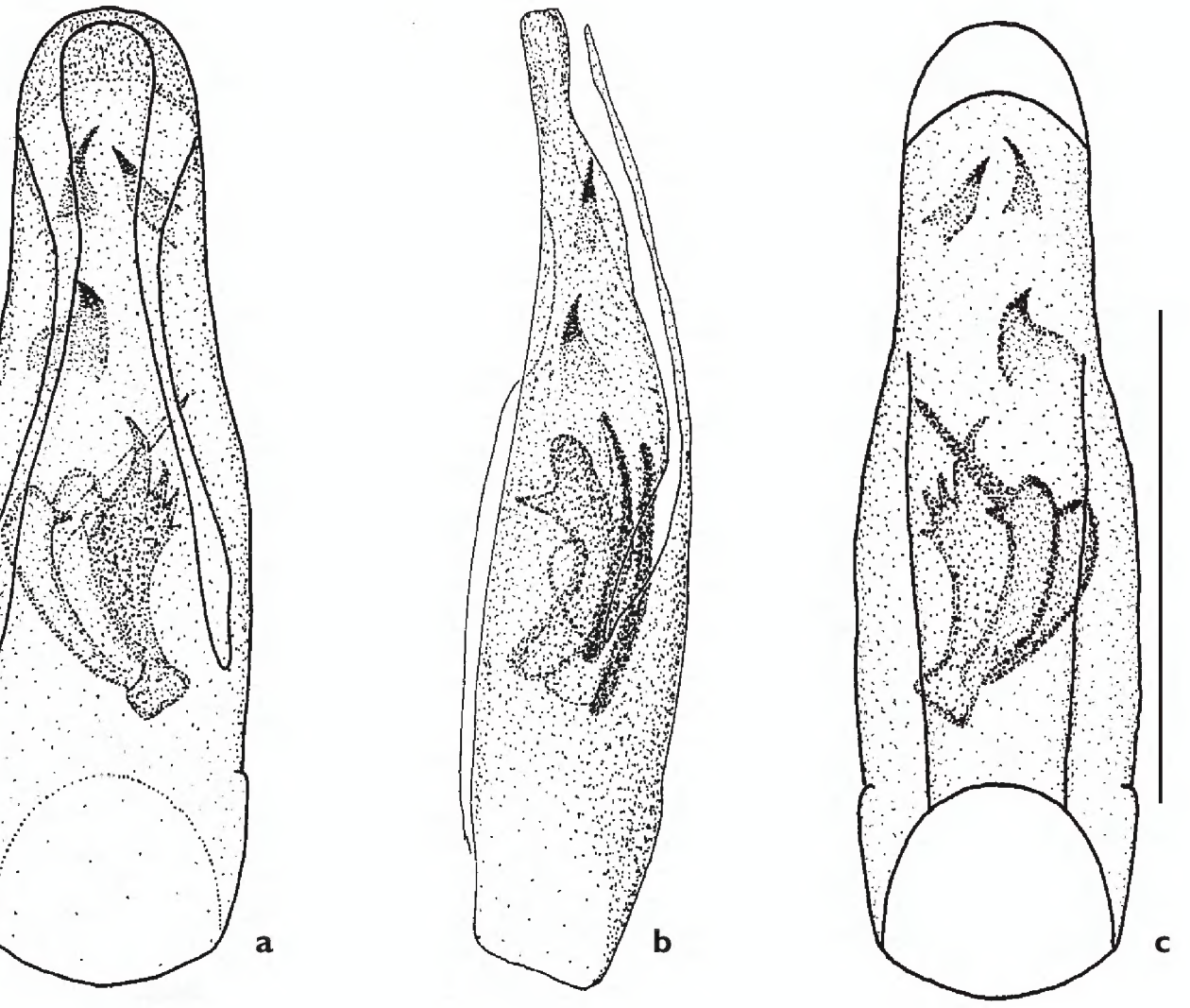

Figure 9. *Arcastes biplagiata* Baly, 1865. Median lobe: **a** dorsal **b** lateral **c** ventral.

Thorax. Pronotal width 1.65–2.25 mm (mean: 1.94 mm), ratio length to width 0.48–0.57 (mean: 0.53). Elytra elongated, black with two longitudinal reddish to yellowish-red oval spots in basal half (Figs 1, 7), in few specimens enlarged up to apical

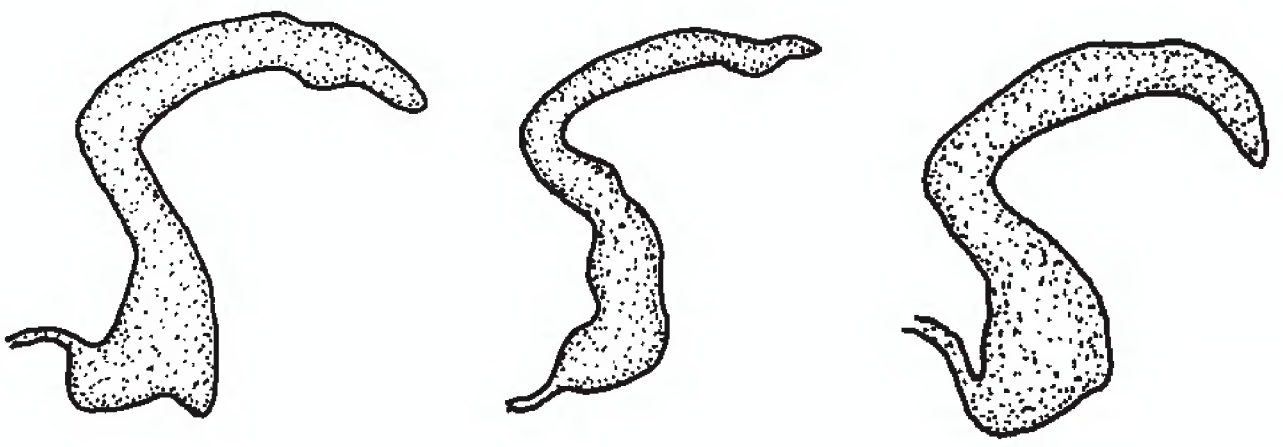

Figure 10. *Arcastes biplagiata* Baly, 1865. Three different spermathecae.

third of elytron. Elytral length 3.80–5.90 mm (mean: 4.93 mm), maximal width of both elytra together 2.50–3.60 mm (mean: 3.15 mm), ratio of maximal width of both elytra together to length of elytra 0.61–0.67 (mean: 0.64).

Abdomen. Pale yellow to brown, occasionally darker on middle, last sternite usually dark brown to black.

Male genitalia. Outer shape of median lobe symmetrical, strongly sclerotized, apex tapered and insignificantly rounded, not incised. Endophallic structure asymmetrical, ventral spiculae large, hammer-like, median spiculae long, slender, lateral spiculae enlarged, with claw-like small spine medially, only one present. Three big spurs located at upper part of endophallic spiculae, most distal one near apex. Tectum not incised at apex, almost reaching apex of median lobe, constricted at middle part and enlarged at base (Fig. 9).

Female genitalia. Spermatheca with slender to oval nodulus. Middle part long and slightly curved, cornu long and curved (Fig. 10).

Distribution. Malaysia, Singapore and Indonesia (Borneo Island and Sumatra), southwards to Java (Fig. 6).

Diagnosis. *Arcastes biplagiata* is the most similar in body outline and general coloration to *A. suturalis*, but the latter has either completely black elytra or a yellowish to yellowish-red spot beyond the scutellum that can be stretched along the entire suture or can be enlarged to a broad reddish sutural band (Figs 11, 12, 13), while *A. biplagiata* has only elongated spots on the disc of each elytron (Figs 1, 7). Endophallic armature of *A. biplagiata* is also different from the other two species of this genus (Fig. 9).

Type material. Lectotype: ♂, "Singapore, Baly Coll." (BMNH) (Fig. 7). Type Locality: Singapore, 1°21'N/103°49'E. – Paralectotype: 1 male, same data as lectotype (BMNH). Baly gave no data on the number of specimens in his description. There are at least two specimens available in BMNH, and we herein designate a lectotype to fix the name on a single specimen.

Further material examined. *Indonesia.* 3 ex., Sumatra, Manna, M. Knappert, Coll Vath, 4°27'S/102°59'E (NNML); 1 ex., Dr. B. Hagen, Tandjong Morawa, Serdang, N.O. Sumatra, 1°21'N/103°49'E (NNML); 1 ex., Java, Dolok Bara, Coll.

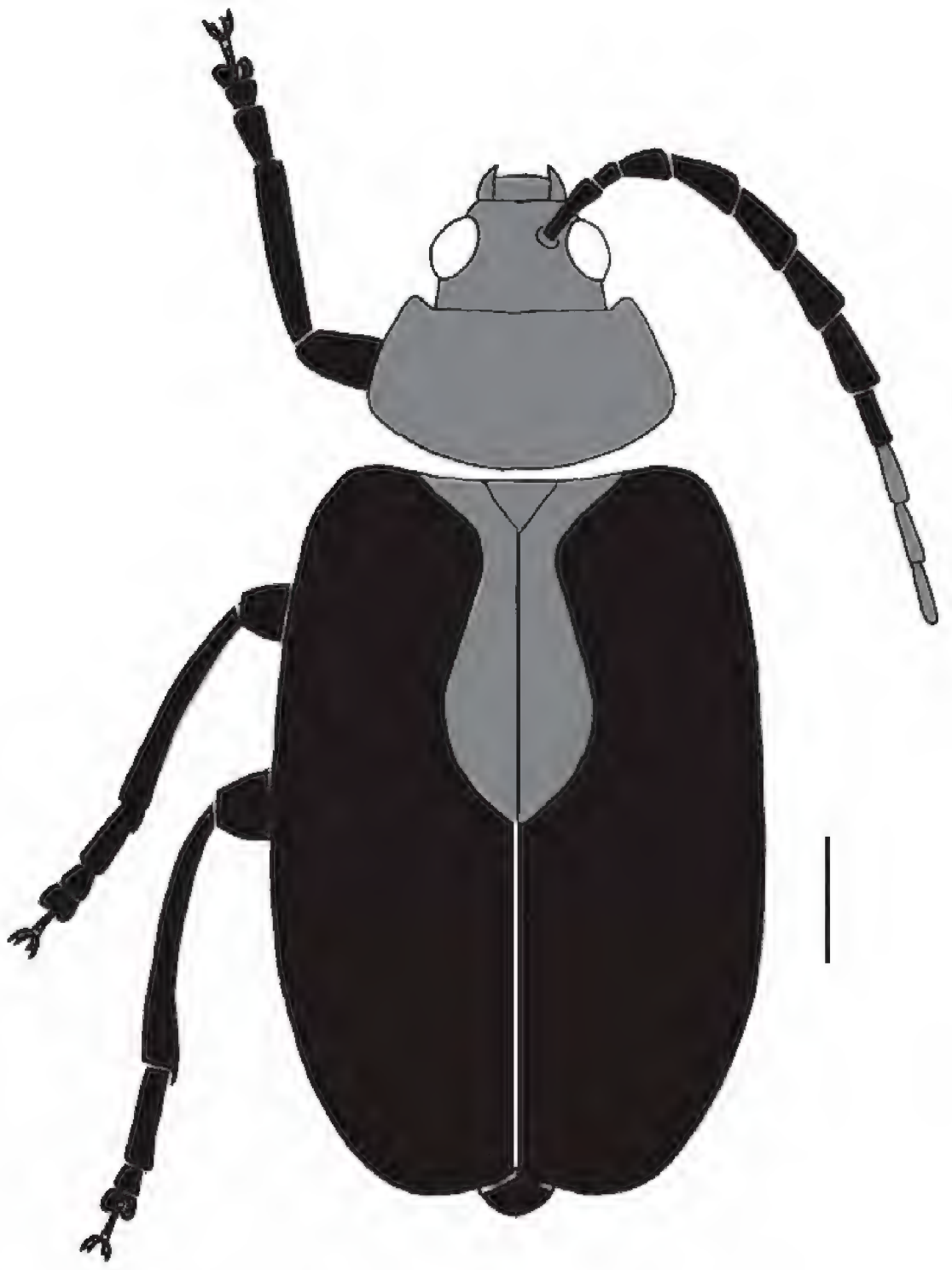

Figure 11. *Arcastes suturalis* Jacoby, 1884. Dorsal colour pattern

Vath, 6°23'S/106°48'E (NNML); 13 ex., N. E. Sumatra, Deli, Kuala Simpang, VIII.1953, A. Sollart, Lowland forests, Museum Leiden, 3°33'N/98°40'E (NNML); 2 ex., Bandar Baroe, Sumatra, J. J. D. V., 0°45'N/98°49'E (NNML); 1 ex., Dolok, Baros, Sumatra, 2°14'N/98°31'E (NNML); 1 ex., Sinabang, Sima, lur Sum, II.1913, Edw. Jacobson, 2°4'N/96°22'E (NNML); 1 ex., Puru Babi, Sima, sum 4.1913, Edw. Jacobson, 2°4'N/96°39'E (NNML); 2 ex., Sumatra, Lampung BBS Np, Way Canguk, Primary Forest, 30.X.2001 (H7), leg. K. Smets, 4°52'S/104°43'E (IRSN); 1 ex., Dohrn, Sumatra, Soekaranda, 71489, 0°37'S/94°29'E (MNHU); 1 ex., Nord Sumatra, Singkil, 17.IX.1972, D. Erber leg., 2°22'N/97°46'E (MNHU); 1 ex., Sumatra, 0°35'S/101°20'E (NHRS); 3 ex., S Sumatra, Lampung prov., Bukit Barisan Selatan, N.P. ±600 m, 5km SW, 7.–17.II.2000, Liwa, J. Bezděk leg., 5°4'S/104°4'E

Figure 12. *Arcastes suturalis* Jacoby, 1884. Photographs of the lectotype of *A. suturalis* Jacoby, 1884: **a** with labels **b** detail.

Figure 13. *Arcastes suturalis* Jacoby, 1884. Photographs of one paratype of *A. ismaili* Mohamedsaid, 2000: **a** with labels **b** detail.

(CJB); 2 ex., E Sumatra, Riau prov., Bukit Tiga Puluh N.P. 18.–25.I.2000, J. Bezděk leg., 0°50'S/102°26'E (CJB). –*Malaysia*. 4 ex., Perak F. M. S., Larut Hills, 3700–4600 ft, 24th Feb. 1932, H. M. Pendlebury, 5°N/100°53'E (BMNH); 2 ex., Pahang, F. M. S., Cameron Highlands, 4500–5000 ft, 18/06/1935, H. M. Pendlebury, 4°30'N/101°28'E (BMNH); 2 ex., Bukit Kutu Selangor, April 1915, 3000–3400, 3°33'N/101°43'E (BMNH); 1 ex., Perak, Maxwell Hill, 04/1–15 August, 1908, 5°N/100°53'E (BMNH); 1 ex., Malay Penin. Perak, F. M. S., 2000 ft, Aug. 30 1922, 4°48'N/101°9'E (BMNH); 1 ex., Penang, 1500–2428, May 1917, 5°22'N/101°17'E (BMNH); 6 ex., Gunong Kledang, Perak, 2646, Nov. 1916, Ex. FMS Museum, B. M. 1955–354, 4°35'N/101°1'E (BMNH); 1 ex., Semangko Pass, Selangor, Pahang, 2700, March 1912, 3°33'N/101°37'E (BMNH); 2 ex., Borneo, 1°6'S/114°8'E (BMNH); 1 ex., Malay Penin, Pahang, FMS, Gunong Benom, 6300ft, 3rd August 1925, I. H. N Evans, 3°50'N/101°55'E (BMNH); 1 ex., Sarawak, 4th division, Gn.

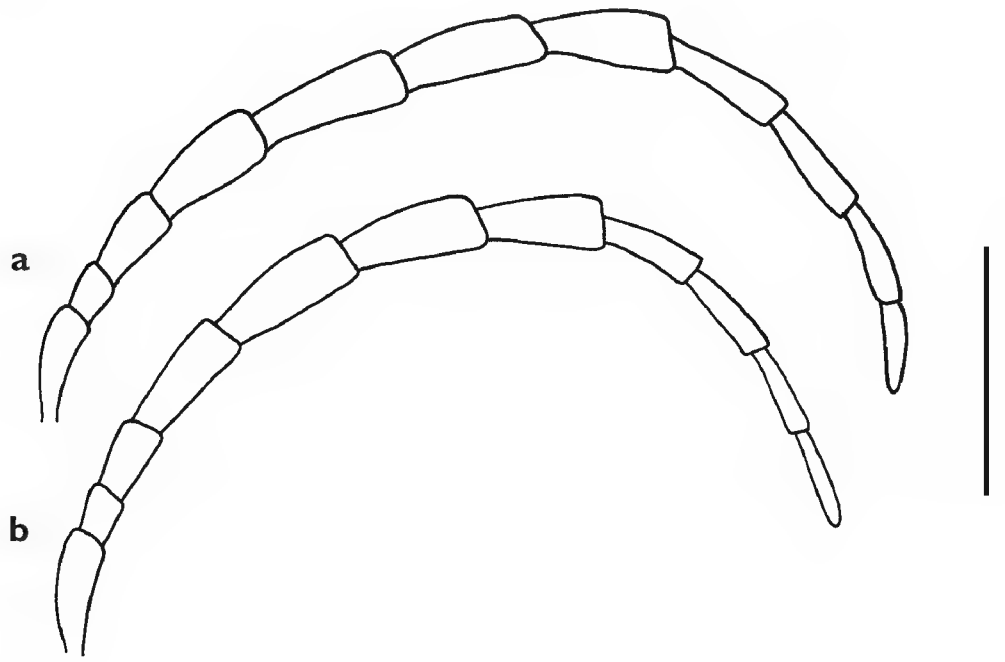

Figure 14. *Arcastes suturalis* Jacoby, 1884. Antennae: **a** male **b** female.

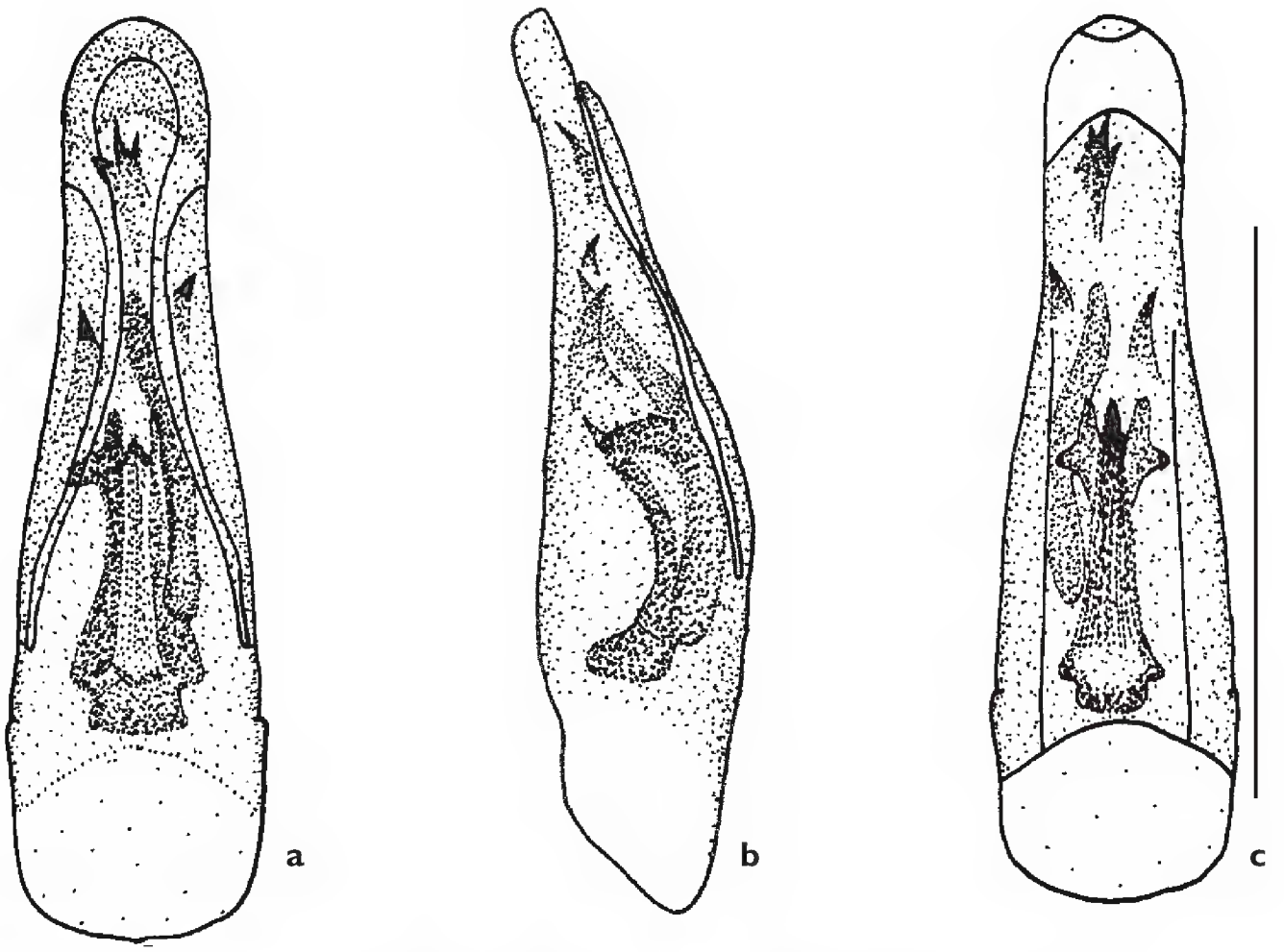

Figure 15. *Arcastes suturalis* Jacoby, 1884. Median lobe: **a** dorsal **b** lateral **c** ventral.

Mulu NP, Below Camp 4, lower montane forest, P. M. Hammond & J. E. Marshall, V.–VIII.1978, B.M. 1978–49, 3°52'N/114°46'E (BMNH); 3 ex., Quop, W. Sarawak, III.–IV 1914, G. E. Bryant, 1°33'N/101°24'E (BMNH); 1 ex., Sarawak, J. E. A. Lewis, 1910–116, 2°33'N/113°E (BMNH); 1 ex., Pahang, Taman Negara, 1.–13.III.1984, L. Jessop, B. M. 1984–230, 4°19'N/102°23'E (BMNH); 1 ex., Pa-

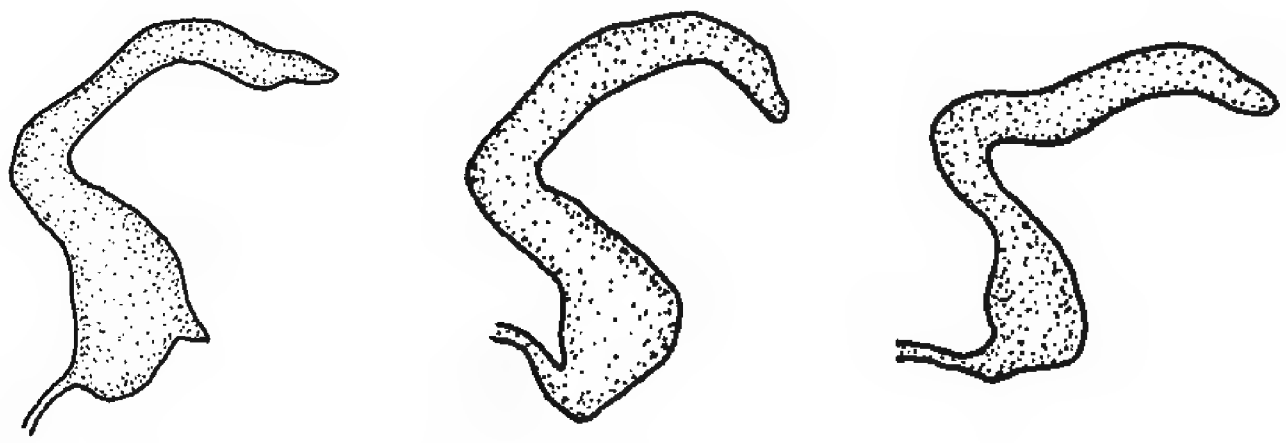

Figure 16. *Arcastes suturalis* Jacoby, 1884. Three different spermathecae.

hang, Gunong Jasar, 4000–5000 ft, 6.X.–14.XI.1980, 4°29'N/101°16'E (BMNH); 1 ex., Johor, Endau Rompin, 1.–4.VI.2007, 2°38'N/103°39'E (BMNH); 1 ex., Matang, 3 1/2 mile, Sarawak, 8.V.1909, 1°32'N/110°15'E (BMNH); 2 ex., Sarawak, 2°33'N/113° (BMNH); 1ex., Mal., Baly Coll. (ST), 4°12'N/101°58'E (BMNH); 1ex., Malacca, Perak, Jachan V., 2°12'N/102°15'E (MNHU); 1 ex., Malaysia, prov. Pahang, Tasik Chini (Lake), primaval forests surrouding lake, 2.–5.III.2007, V. Hula, L. Purchart, Růžička F., 3°23'N/102°55'E (CJB); 2 ex., Malaysia, Perak, 1200 m, 25 km near Ipoh, Banjaran Titiwangsa, Mts. Korbu, 6.–12.V.2007, M. Říha, leg., 4°56'N/101°38'E (CJB); 2 ex., Malaysia, Pahang distr., 30 km NE Raub, Lata Lembik, 200–400 m, 22.IV.–15.V.2002, E. Jendek & O. Šauša leg., 3°56'N/101°38'E (CJB); 2 ex., Malaysia, Taman Negara NP, Kuala Tahan, primaval forests, 5.–9. III.2007, V. Hula, L. Purchart, Růžička F., 4°19'N/102°20'E (CJB). – *Singapore.* 2 ex., 7.VIII.1922, F. N. Coll, 1°21'N/103°49'E (BMNH); 1 ex., Sime Forest, Mal. Trap, station 25131, 20.V.2005, leg. P. Grootaert, 1°21'N/103°49'E (IRSN).

Arcastes suturalis Jacoby, 1884

Arcastes suturalis Jacoby, 1884: 217.
= *A. ismaili* Mohamedsaid, 2000: 282; syn. n.

Total length. 4.70–6.35 mm (mean: 5.30, n=12)

Head. Reddish-brown to red. Details of mouthparts and impressions on vertex like the description of the genus. Antennae entirely black and only the terminal three antennomeres usually contrasting pale yellow to reddish (Figs 11, 12). Shape of antennomeres like the description of the genus. Ratio length of second to third antennomere 0.50–0.57 (mean: 0.54), ratio length of third to fourth antennomere 0.67–0.70 (mean: 0.68), apical three antennomeres significantly slenderer (Fig 14).

Thorax. Shape and coloration of pronotum and scutellum like in the description of the genus (Figs 11, 12, 13). Pronotal width 1.55–2.10 mm (mean: 1.80 mm), ratio

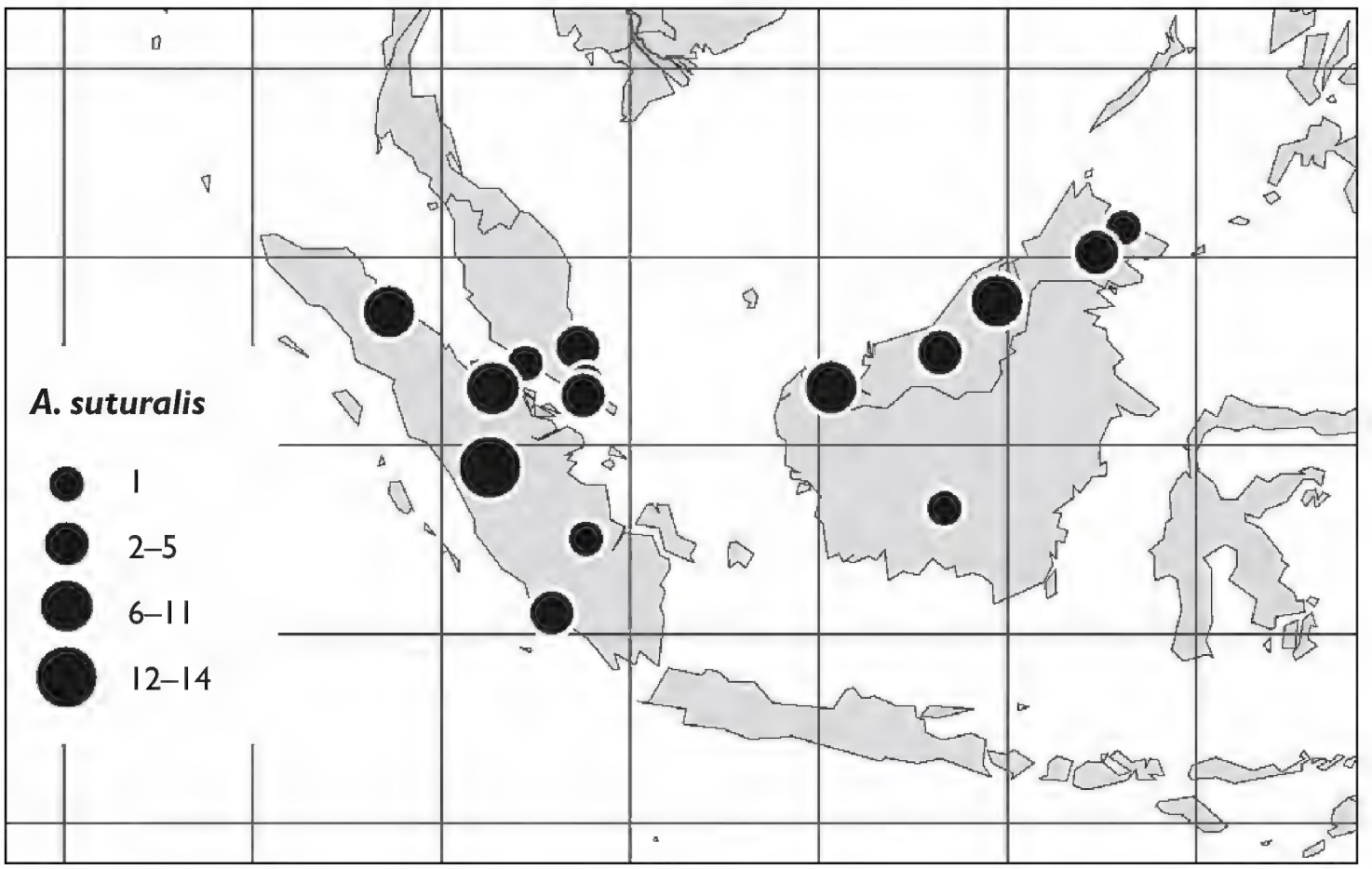

Figure 17. Distribution of *A. suturalis* Jacoby, 1884.

length to width 0.50–0.55 (mean: 0.53). Scutellum in about one third of material studied black, others brown, red or yellowish-red. Elytra elongated, black throughout in 35 % of the material examined, about 10 % with yellowish scutellar elytral spot, 50 % with entirely yellowish-red suture, and remaining material with enlarged yellowish-red elytral disc like in the specimens of *A. ismaili* (Fig. 13). Elytral length 3.80–5.05 mm (mean: 4.40 mm), maximal width of both elytra together 1.50–3.30 mm (mean: 2.40 mm), ratio of maximal width of both elytra together to length of elytra 0.63–0.69 (mean: 0.66). Underside and legs like in the description of the genus.

Abdomen. Pale yellow to brown on the sides of sternites, dark brown to black in the middle, terminal sternite usually completely black.

Male genitalia. The outer shape as in the description of the genus. Endophallus with three spur located at the upper part, the biggest one next to the lateral spiculae. Tectum not incised at apex, slender, almost reaching towards the apex of the median lobe (Fig. 15).

Female genitalia. Spermatheca with slender to oval nodulus. Middle part moderately long and slightly curved, cornu long and curved (Fig. 16).

Distribution. Recorded from Malaysia, Singapore and Indonesia (Fig. 17).

Diagnosis. *Arcastes suturalis* can be distinguished from the other two species of *Arcastes* by the elytral coloration, which is either completely black, or posses a yellowish to reddish sutural coloration that can be occasionally enlarged to pale a yellowish elytral disc. No specimen examined had longitudinal elytral stripes as it is typical for *A. biplagiata* (Figs 1, 7). Finally a check of genitalia can confirm the identification (Figs 9, 15).

Type material. *Arcastes suturalis*: Lectotype: ♂, "*Arcastes suturalis* Jac./ Dr. B. Hagen, Tandjong Morawa Serdang, (N.O. Sumatra)." (Fig. 12) (NNML). Type locality: 1°21'N/103°49'E. – Paralectotypes: 11 ex., same data as lectotype (NNML), and at least one additional type specimen is deposited in MCZH. We herein designate a lectotype to fix the name on single specimen. – Invalid types: 2 ex. from Sumatra, Lianggas, and Soekaranda, Januar 1894, Dohrn (MNHU) are labelled as co-type, but are not from the type series.

Arcastes ismaili: Holotype: ♂, "Malaysia, Sabah, Danum, Ekspedisi Gunung Danum, 6–12.vi.1989, Ismail" (Fig. 13) (UKM). Holotype by original designation. Type locality: 5°8'N/117°24'E. – Paratypes: 7 ♂, 9 ♀, same data as holotype; 1 ♀, Sabah, Lembah Danum, 21.VIII.1989, Salleh, Ismail & Nor; 2 ♂, 1 ♀, 16.–19.V.1991, Zaidi, Ismail & Ruslan; 1 ♂, 1 ♀, 27.–31.VIII.1991, Salleh, Zaidi, Mail & Lan; 1 ♂, 3 ♀, 17.–20.IV.1992, Ismail, Yusuf & Razali; 4 ♂, 2 ♀, 22.–25.VIII.1992, Ismail, Yusuf & Sham; 1 ♂, 5.–8.XII.1992, Ismail, Yusuf & Razali. Due to the original publication, the holotype is deposited in the Center for Insect Systematics, Universiti Kebangsaan Malaysia, Bangi (UKM), and two pairs of paratypes (2 ♂, 2 ♀) in the Insect Collection, Forest Research Centre, Sandakan, Sabah.

Further material examined. *Indonesia.* 1 ex., Borneo, Kalimantan Tengah, Busang/Rekut. Confl. FIT, Primary Forest, Brendell/Mendel, August 2001, 1°40'S/113°22'E (BMNH); 1 ex., Bari, Jan. 190?, Jacoby Coll. 1909–28a, 0°31'S/104°30'E (BMNH); 1 ex., Soekaranda, Januar 1894, Dohrn, 0°37'S/94°29'E (NNML); 2 ex., Sumatra, Manna 1902, M Knap Pert., 4°27'S/102°59'E (NNML); 1 ex., Dohrn, Sumatra. Lianggagas, 0°37'S/94°29'E (NNML); 3 ex., Medan, Sumatra, J. J. D. V, 3°30'N/98°37'E (NNML); 9 ex., N. E. Sumatra, Deli, Kuala Simpang, VIII 1953, A. Sollart, Lowland forests, Museum Leiden, 3°33'N/98°40'E (NNML); 1 ex., Dohrn, Sumatra, Lianggagas, co-type, 0°37'S/94°29'E (MNHU); 1 ex., Soekaranda, Januar 1894, Dohrn, co-type, 0°37'S/94°29'E (MNHU); 1 ex., Tamiang, Sumatra, 2°29'S/103°54'E (MNHU). – *Malaysia.* 10 ex., Sarawak, 4th Division, Gn. Mulu NP, nr Base Camp, 50–100 m, P. M. Hammond & J. E. Marshall, V.–VIII.1978, B. M. 1978–49, 3°52'N/114°46'E (BMNH); 11 ex., Quop, W. Sarawak, II.–IV.1914, G. E. Bryant, G. Bryant 1919–147, 1° 33'N/101°24'E (BMNH); 6 ex., Mt. Matang, W. Sarawak, Dec. 1913, G. F. Bryant, G. Bryant coll. 1919–147, 1.55N/110.35E (BMNH); 3 ex., Sarawak, C. J. Brooks, B. M. 1928–193, 2°30'N/113°15'E (BMNH); 1 ex., Sarawak, 1907–1909, C. J. Brooks, B. M. 1936–681 (BMNH); 2 ex., Mt. Matang, 3 1/2 mile, 8.V.1909, Sarawak, J. E. A Lewis, 1910–116, 1.55N/110.35E (BMNH); 1 ex., N. Borneo, Samawang, Nr. Sandakan, July 1927, 5°50'N/118°6'E (BMNH); 1 ex., Johor, Kota Tinggi, 27.XI.2007, M. Y. Ruslan, 1°43'N/103°54'E (UKM); 4 ex., Johor, Endau Rompin, 1.–4.VI.2007, B. H. Izfa, 2°38'N/103°39'E (UKM); 1 ex., Malaysia, prov. Pahang, Tasik Chini (Lake), primaval forests surrouding lake, 2.–5.III.2007, V. Hula, L. Purchart, Růžička F., 3°23'N/102°55'E (CJB); 1 ex., Malaysia, Pahang prov., Taman Negara, N.P., Kuala Tahan, 14.III.2007, Igt. Jiří Foit, 4°19'N/102°20'E (CJB); 1 ex., Pahang, Hutan Simpan Kuala Lompat, 24–26.V.1990, Zaidi, Ismail & Ruslan,

3°41'N/102°13'E (CJB); 2 ex., Malaysia, Taman Negara NP, Kuala Tahan, primaval forests, 5–9.III.2007, V. Hula, L. Purchart, Růžička F., 4°19'N/102°20'E (CJB). – *Singapore.* 3 ex., Nee Soon, 14.X.2005, Swamp Forest, Malaise trap 1, station 25388, leg. P. Grootaert, 1°21'N/103°49'E (IRSN).

Arcastes dimidiata Laboissière, 1929

Arcastes dimidiata Laboissière, 1929: 92.

Total length. 4.70–6.80 mm (mean: 5.85, n=5)

Head. Reddish-brown to red. Details of mouthparts and impressions on vertex like the description of the genus. Basal two and terminal two to three antennomeres yellowish-red, some specimens also with black antennal base (Figs 18, 19). Shape of antennomeres like description of the genus, but median antennomeres less enlarged. Ratio length of second to third antennomere 0.50–0.57 (mean: 0.53), ratio length of third to fourth antennomere 0.60–0.70 (mean: 0.66; Fig. 20).

Thorax. Shape and coloration of pronotum and scutellum like in the description of the genus (Figs 18, 19). Pronotal width 1.70–2.20 mm (mean: 1.99 mm), ratio length to width 0.53–0.55 (mean: 0.54). Basal third of elytra entirely reddish-brown to red, apical two third black (Figs 18, 19). Elytral length 4.00–5.90 mm (mean: 5.04 mm), maximal width of both elytra together 2.90–4.00 mm (mean: 3.46 mm), ratio of maximal width of both elytra together to length of elytra 0.66–0.70 (mean: 0.68). Underside and legs like in the description of the genus, some specimens also with reddish femur.

Abdomen. Pale yellow to brown, occasionally darker on middle, and last sternite usually dark brown to black.

Male genitalia. The outer shape as in the description of the genus. Endophallus with three spurs located at the upper part, the biggest one next to the lateral spiculae. Tectum not incised at apex, slender, almost reaching towards the apex of the median lobe (Fig. 21).

Female genitalia. Spermatheca with oval to elongated nodulus. Middle part more less long and slightly curved, cornu long and curved (Fig. 22).

Distribution. Recorded from Sabah (Borneo) and western Sumatra (Fig. 6).

Diagnosis. *Arcastes dimidiata* can be easily differentiated from *A. biplagiata* and *A. suturalis* by the elytral coloration. The basal elytral third is reddish and strongly contrasting with the black two terminal thirds, while it possess neither a pale suture nor elytral spots (Figs 1, 11, 18).

Type material. Holotype, 1 ♂, "Siberut Island, West Sumatra, Sept. 1924, G. B. K and N. S, *Arcastes dimidiata* Laboissière, 1929" (Fig. 19) (BMNH). Holotype by monotypy. Type locality: 1°55'S/99°17'E.

Further material examined. *Malaysia.* 1 ex., N. Borneo, Samawang, Nr. Sandakan, 14th July. 1927, Ex. F. M. S. Museum. B. M. 1955–354, 5°50'N/118°6'E

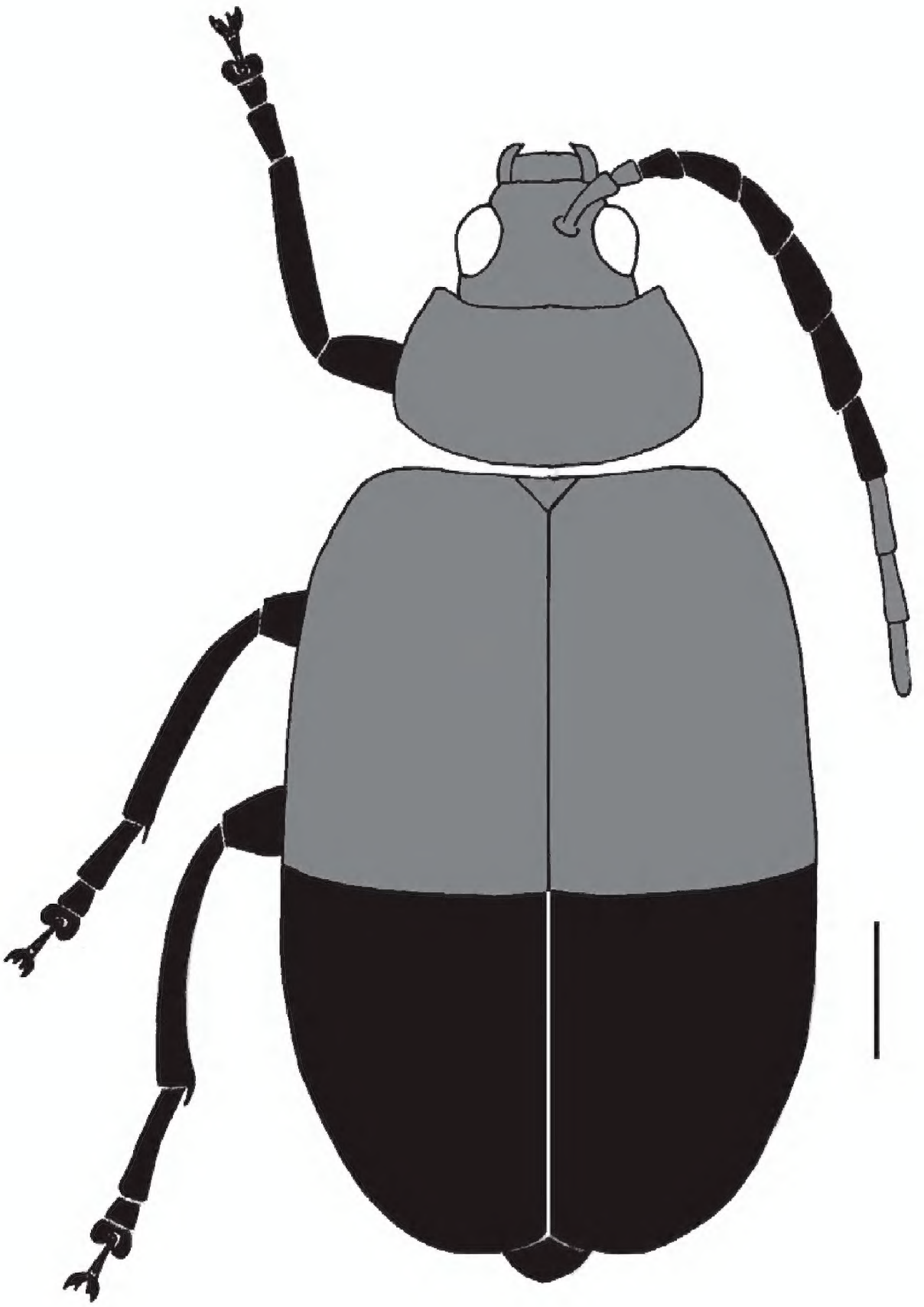

Figure 18. *Arcastes dimidiata* Laboissière, 1929. Dorsal colour pattern.

(BMNH); 2 ex., N. Borneo, Mt. Kinabalu, Pinosuk Plateau, 14.–17.III.1964, 5,225 ft, Royal Soc. Exped., col. S. Kueh, B. M. 1964–250, 6°4'N/116°33'E (BMNH); 1 ex., Borneo. Kinabalu, Jacoby Coll. 1909–28a, 6°4'N/116°33'E (BMNH).

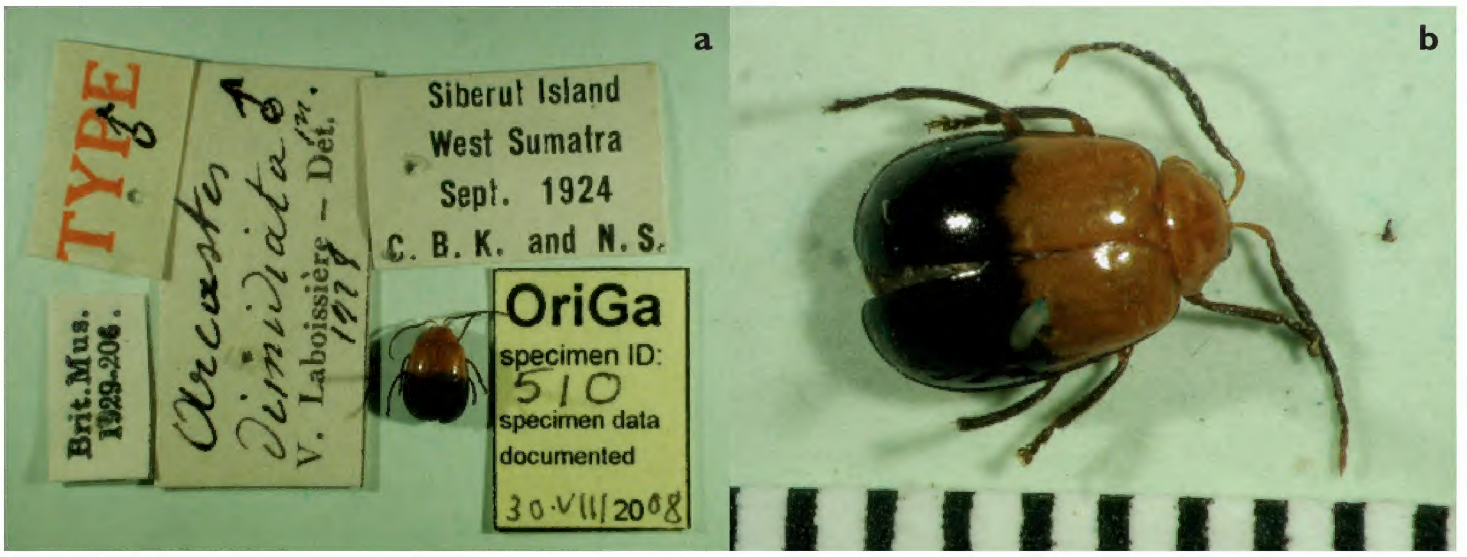

Figure 19. *Arcastes dimidiata* Laboissière, 1929. Photographs of the holotype *A. dimidiata* Laboissière, 1929: **a** with labels **b** detail.

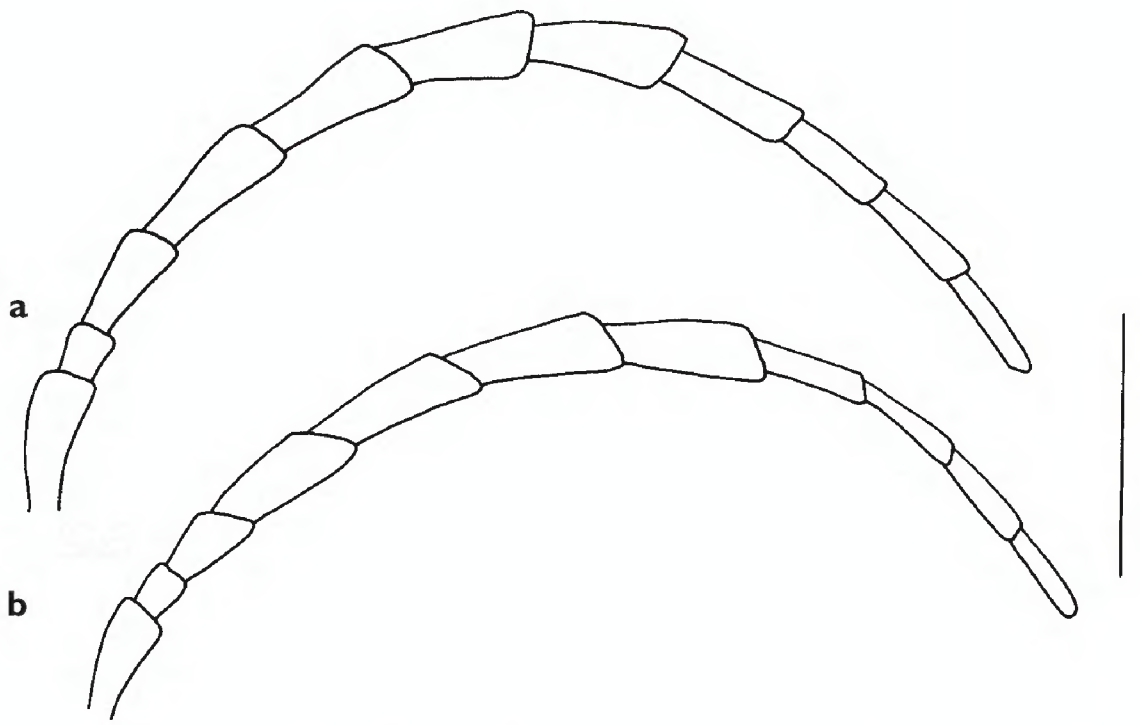

Figure 20. *Arcastes dimidiata* Laboissière, 1929. Antennae: **a** male **b** female.

Identification key of *Arcastes*

1. Elytra usually with yellowish to red spots or suture, rarely entirely black; first to seventh antennomere black, outer antennomeres usually contrasting pale yellow to reddish **2**
– Basal third of elytra reddish-brown to red, apical two third black, basal two and terminal two to three anntennomeres yellowish-red.....***A. dimidiata***
2. Each elytron with median, usually longitudinal reddish to yellowish-red oval spots in the basal half, in few specimens enlarged up to the apical third of elytron ..... ***A. biplagiata***
– Elytra black throughout or with yellowish scutellar elytral spot, yellowish-red suture, or rarely with enlarged yellowish-red elytral disc.....***A. suturalis***

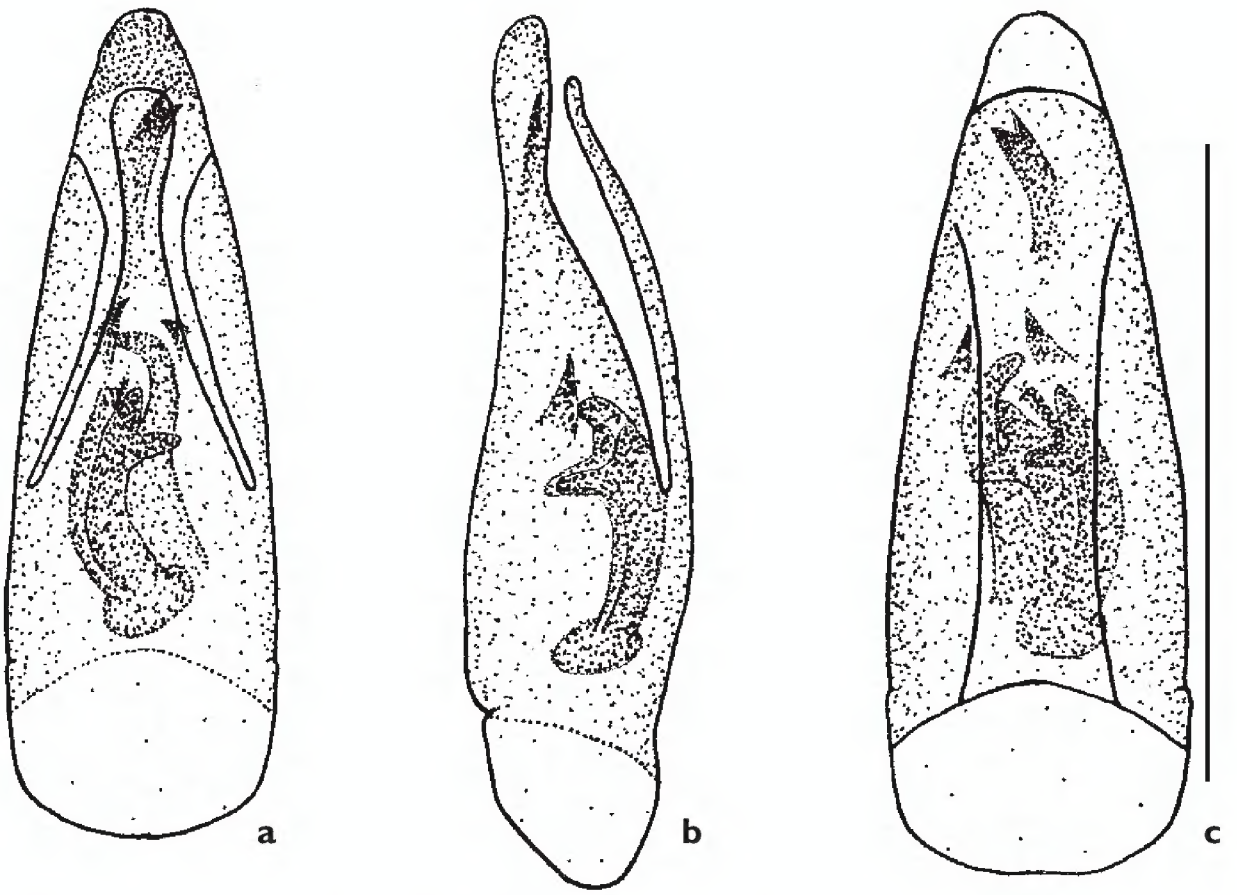

Figure 21. *Arcastes dimidiata* Laboissière, 1929. Median lobe: **a** dorsal **b** lateral **c** ventral.

Figure 22. *Arcastes dimidiata* Laboissière, 1929. Two different spermathecae.

Acknowledgements

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